



SPACE CENTER

Roundup

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2001: A SPACE ODYSSEY

See pages 4-5 for a JSC year in review

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ISS: Moving into the future

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HR is on the job

By Greg Hayes, Director of Human Resources



If we were to characterize JSC's past few years, we'd all agree that it's been a time of tremendous change. From a people standpoint, pause for a moment to consider how much the Center has changed in the past five or six years.

For those of you who keep your old JSC phone books, pull out the November 1994 issue and turn to page 13, the JSC organization chart. Of the 21 senior managers pictured, count the number still here (I'll save you some time: Two!).

Change is with us, and it's accelerating. In fact, the next few years will present more opportunities for change than we've likely ever seen. Thus, I'd like

to give you some insight into how your HR team is planning for the future.

Workforce thoughts

Nearly a third of the JSC workforce is eligible to retire today. While we hope they won't leave all at once, in general people do leave within a few years of attaining eligibility. The Center needs a better understanding of the implications associated with this and other workforce dynamics so that we can plan our recruiting, hiring and development programs accordingly.

At the same time, more than 340 of our civil service teammates are new to JSC in the last two years. We'll add another 120 or so this year, which means more than 12 percent of our civil service workforce will have three or fewer years of experience by the end of FY2002. This presents a real challenge for us from a development standpoint, so we're emphasizing a number of efforts designed to bring the new members of our workforce up to speed as quickly and efficiently as possible.

Dealing with stress and improving morale

Given the challenges we have ahead of us, we know that we'll have to continue to pay close attention to issues of stress and morale. We believe we're making some progress toward dealing with our stress issue, however much remains to be done. Rest assured we will continue to address that issue through ongoing activities as well as some new efforts.

We're working now, for example, to put more tools in the hands of managers to help them identify and deal with potential problems early on, hopefully identifying some of the "leading indicators" of stress. We're close to providing periodic reports of other indicators, including overtime and comp time trends, forfeited leave and so forth, which indicate potential problems. We'll continue to work with our partners in Space and Life Sciences to attack this problem.

Under the guidance of our new Exchange Manager, Debbie Conder, you'll also see a number of improvements in the services we offer through our JSC Exchange http://jscpeople.jsc.nasa.gov/jsc-hro-2/jsc_exchange/default.htm – the cafeterias, Gilruth Center, stores, etc. We have just finished a major remodeling effort of the upstairs portion of the Gilruth to better accommodate your training, conference and social needs.

Our new on-line store, ShopNASA.com, is now operating, giving you the opportunity to shop from your workstation. We also are exploring a number of new services we can provide – ranging from take-home meals to shoe repair – in response to the comprehensive needs survey we recently conducted. You'll be hearing more about these possibilities in a separate *Roundup* article soon.

As mentioned above, change is with us, and it's not going to slow down. We are responding to those needs as rapidly as possible as the list below shows:

- ❖ Two new Leadership Programs: A Leadership Development Program <http://leadership.jsc.nasa.gov> and a Center-wide Mentoring program <http://jscpeople.jsc.nasa.gov/mentoring/> (future *Roundup* coverage)
- ❖ Increased training for the center, including more and better computer-based training
- ❖ An Oral History Program that continues to capture the best of our retiring leadership
- ❖ Added change-management staff to assist the workforce and directorates
- ❖ New Automated Recruiting and Staffing Tool (NASA STARS) <http://nasastars.nasa.gov/> for staffing and recruiting
- ❖ Two new Education programs: The Middle School Aerospace Scholars and the Community College Aerospace Scholars <http://education.jsc.nasa.gov/Educators/MAS> (future *Roundup* coverage)

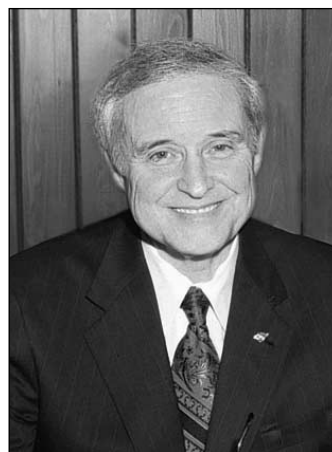
Let us hear from you

Above all else, HR is a service organization. We're committed to doing those things that help build a committed and capable workforce and which prepare us for the future. We're interested in hearing from you. We'll be doing more surveys, both formal and informal, in the future to determine how we're doing and how we can better serve you.

We believe we can do even more to help the Center achieve its objectives. If you have ideas about how we can do so, let us know. We do listen – the Mentoring program resulted from an idea put forth by the JSC Diversity Council. ❖

For more information at HR, please visit our Website at <http://hro.jsc.nasa.gov/>

FROM THE DESK OF ROY S. ESTESS



The Space Center *Roundup* has been reporting the news at JSC for more than 40 years.

I hope everyone was able to enjoy the recent edition of the *Roundup* that reflected on the history of JSC and how we have grown into the

strong center we have become.

The *Roundup* has helped us celebrate our achievements and reflect on our successes. We look to the *Roundup* to provide us with the latest news and to share in the story of JSC. As we continue the exploration of Human Space Flight, we see our *Roundup* news coverage also moving forward into a new look and style.

I hope you enjoy this new *Roundup*. We are proud of this publication as it continues to serve as reflection of our community here at JSC.

Roy S. Estess

WISDOM GAINED, WISDOM GIVEN JSC launches new mentoring program

This month, JSC introduces a new mentoring program designed to enhance, or guide, the personal and professional growth of each of our employees.

The program links a mentor with a protégé to help facilitate personal and professional growth by sharing the knowledge and insights learned through the years. Mentoring is a strategy for comprehensive growth and development and in its truest form, a reciprocal relationship.

Both members have a chance to learn, to gain a new perspective on the work environment, to stretch beyond comfortable boundaries and to meet people from across the center.



"People are the most important product of any organization and mentoring is the most important job any of us have," said Randy Stone,

JSC Deputy Director. "Take the time, make the effort, build a bright future!"

Visit <http://jscpeople.jsc.nasa.gov/mentoring/> for information or to apply online for the mentoring program. Applications will be accepted Jan. 22 through Feb. 8, 2002. The mentoring program is open to all permanent JSC civil servant and military employees in Houston and at White Sands Test Facility.

Welcome to 2002 and welcome to a new Roundup!

You might have noticed this issue looks different than previous issues. However, that's just one change in the overall product.

The *Roundup* is now a monthly magazine. Each issue will feature regular columns by Directors, interesting stories and entertaining profiles. The new *Roundup* will provide in-depth coverage of the people and programs that make JSC a success.

To better serve you, the print *Roundup* is now working hand-in-hand with the online *CyberRoundup*.

As in the past, the *CyberRoundup* will be updated Monday through Friday for all the latest information.

In addition to all that was there before, the *CyberRoundup* will now give you more announcements, current news and feature stories.

You will now have the best of both worlds – detailed coverage with the *Roundup* and the latest news with the *CyberRoundup*.

As always, please submit your information and articles to Melissa Davis, at melissa.davis1@jsc.nasa.gov.

Finally, please make it part of your daily routine to visit *CyberRoundup*. Go to <http://www.jsc.nasa.gov/pao/roundup/> and bookmark it.

You'll never know what you're missing if you don't! ❖

WSTF helps Odyssey Spacecraft surf the waves of the Martian atmosphere

With increased national interest in the success of NASA's 2001 Mars Odyssey Mission and the red planet in general, a White Sands Test Facility (WSTF) team is proud of its work on the pyrovalves aboard the Mars Odyssey spacecraft.

The pyrovalves are single-use, explosively actuated isolation valves that initiate the flow of propellant to the various rocket engines aboard the spacecraft.

The Mars Odyssey mission is well under way and in a looping orbit around Mars of 18 hours and 36 minutes. The spacecraft will be literally surfing the waves of the Martian atmosphere in a process called aerobraking, which will reduce the long elliptical orbit into a shorter, two-hour circular orbit of approximately 400 kilometers (about 250 miles) altitude.

The WSTF pyrovalve team was formed in 1995, following the loss of the Mars Observer spacecraft in 1993, which stopped communicating just as its rocket engines were being activated for spacecraft orbit around the planet.

This failure, as well as the subsequent destruction of the Telstar 402 and Landsat 6 satellites, was strongly related to the actuation of these explosive pyrovalves. As early as 1996, WSTF testing revealed that the older type pyrovalves, such as used on the Mars Observer, could leak pyrotechnic constituents into the highly reactive hydrazine propellant system, triggering an explosion that could destroy the spacecraft.

NASA Headquarters established a Mars Observer Propulsion and Pyrotechnics Corrective Action Test Program with representatives from headquarters, WSTF and several other NASA centers and industry leaders.

WSTF was requested to perform testing and prepare documentation to support the corrective action effort. In response to the requests, they designed and built a dedicated pyrovalve test facility and laboratory to measure and analyze any tiny quantities of the pyrotechnic actuation charge, called "blow-by," which may escape from the valve into the stream of liquid propellant.

These state-of-the-art facilities include a laser-based velocity interferometer to characterize operation of internal components of the pyrovalves. WSTF also developed special processes in coordination with neutron-radiographic facilities to inspect internal seals and disclose the distribution of blow-by constituents inside the valves.

The program thoroughly characterized pyrovalve operation, identified the mass and chemical constituents of pyrotechnic blow-by and clearly demonstrated how the hot blow-by particles could cause the hydrazine to explode by performing system level simulations.

The WSTF work did not stop there though. They developed improved pyrovalve configurations and continued to work with manufacturers to develop safer and more reliable valves.

For example, the early pyrovalves used on the Mars Observer spacecraft could leak more than 20 milligrams of hot blow-by gas and particles into the propellant stream, whereas the redesigned valves typically leak as little as a 10,000th as much.

During WSTF blow-by testing of the valve configuration chosen for use on the Odyssey vehicle, one valve failed to open upon command. The valve manufacturer incorporated improvements following the WSTF failure, but analysis indicated that a failure might still be possible.

The risk of an Odyssey pyrovalve failure was considered low, yet the Odyssey Program wanted the risk mitigated since such a failure on the real vehicle could have meant the loss of the mission.

Since there was only two months until the planned launch of the Mars Odyssey mission, a joint NASA-Industry risk reduction team was rapidly assembled, which included the WSTF team personnel.

The valve manufacturer made design and material changes as directed by the risk reduction team, and testing at both contractor and WSTF facilities indicated the problem had been solved, leaving just enough time to install the new components into the

pyrovalve and interface the spacecraft to the launch vehicle.

"This was a great program for me," said Steve Schneider, NASA program manager. "When pyrovalve behavior is anomalous, a panic situation usually results."

The Mars Odyssey Mission was successfully launched April 7, 2001, as originally planned. Subsequent NASA programs directly benefiting from the WSTF work have included the Chandra X-ray Observatory, the Mars Surveyor 1998 spacecraft, the X-38 Crew Return Vehicle and other commercial projects.

Since 1995, highlights of the WSTF pyrovalve testing and analysis have been published in nine American Institute of Aeronautics and Astronautics (AIAA) journals.

Last year's presentation won best paper in the Energetic Components and Systems Technical sessions at the 36th annual AIAA/American Society of Mechanical Engineers/Society of Automotive Engineers/American Society of Engineering Education Joint Propulsion conference.

Current WSTF Pyrovalve Team members are Regor Saulsberry (NASA), Howard Julien, Max Leuenberger (Honeywell), and William Smith (Honeywell) and Aaron Paz (NASA Co-op).

"It was my pleasure to work on the test methodologies and new facilities for pyrovalves at WSTF with such a dedicated and capable group of people," Schneider said.

Paz enjoyed being part of the project. "My involvement in this project was to actually run some of the pyrovalve tests," he said. "As a NASA Co-op, I must say that it is extremely rewarding to know that the work I have done here has a very significant purpose."

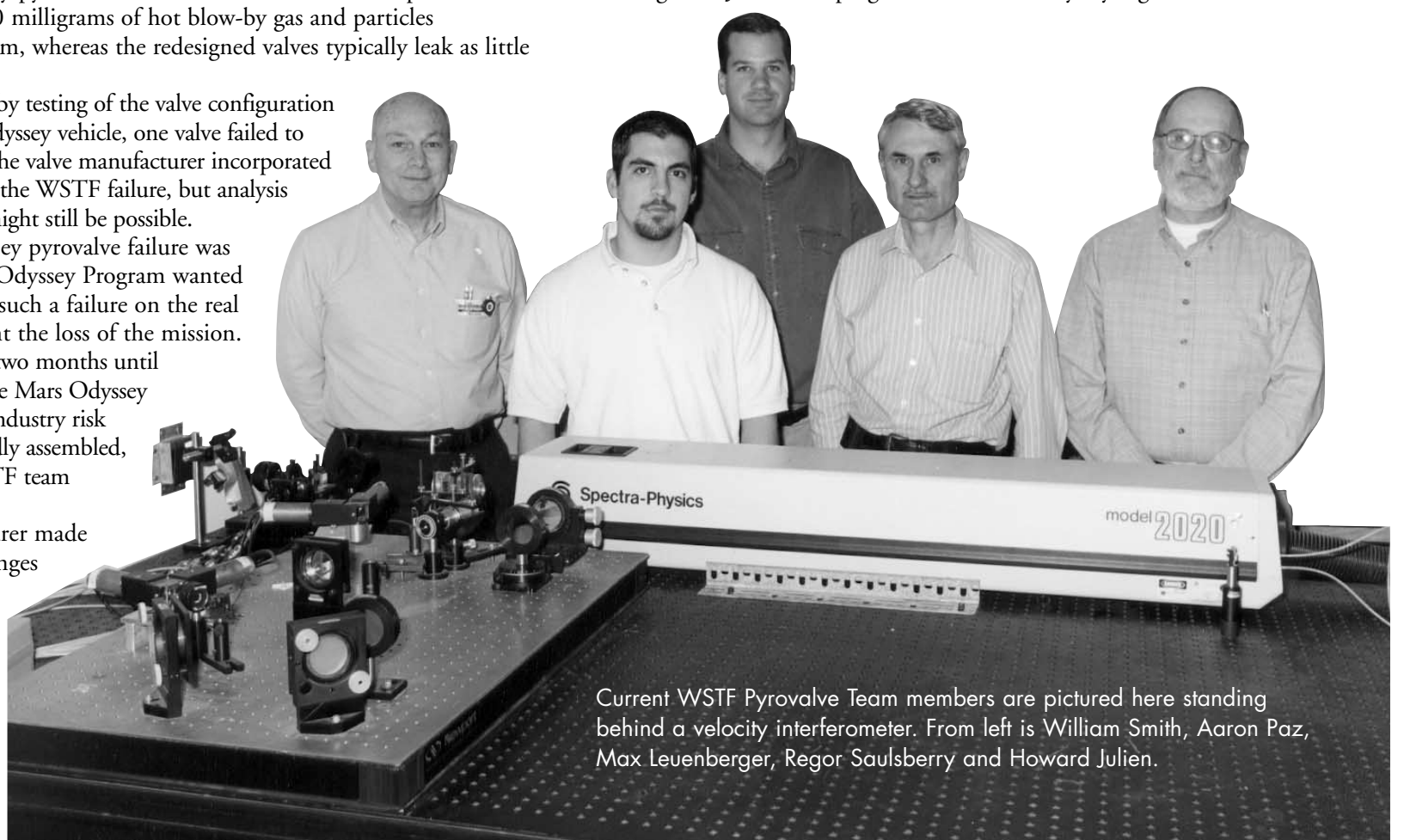
He added, "It has also been a great learning experience. My future plans are to design and test more advanced pyrovalves, which could reduce the amount of gas blow-by and improve spacecraft reliability."

The team is now working a NASA Headquarters request to refine pyrovalve test methods and develop improved valve designs and nondestructive test methods, as well as to create a pyrovalve applications handbook to enhance spacecraft safety.

"Having the Pyrovalve Blowby Analysis Laboratory and Pyrovalve Propellant Hazardous Test Facility at WSTF is important for NASA to address future pyrovalve concerns," Schneider said. "I learned a great deal about pyrovalves on this program, especially that the 'devil is in the details' when designing test apparatus and evaluating the data."

The team also continues to serve NASA and the propulsion industry at large as they remain vitally involved in the success of the pyrovalve operations aboard NASA spacecraft, such as the 2001 Mars Odyssey.

"We're really pleased to have been able to play some small part in the success of these missions," Saulsberry said, "and we look forward to the frequent reports coming from JPL on the progress of the Mars Odyssey flight." ♦



Current WSTF Pyrovalve Team members are pictured here standing behind a velocity interferometer. From left is William Smith, Aaron Paz, Max Leuenberger, Regor Saulsberry and Howard Julien.